

## REMARKS

Reconsideration of the present application, as amended, is respectfully requested. Claims 8-13, and 18-42 of the present application are currently pending. Claims 8-13, 18, 23-25 and 39-42 have been allowed. Claims 19, 23, 26, and 32 have been amended to more particularly point out and distinctly claim the invention. No new matter has been introduced.

### 35 U.S.C. § 103 Rejections

The Examiner has rejected claims 19-21, 26-27, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. 3,045,702 by Nakata (hereinafter "Nakata"), in view of U.S. Pat. 4,778,532 by McConnell et al. (hereinafter, "McConnell"). In light of the amendment, the Examiner's rejections have become moot. Nonetheless, the following remarks regarding the Examiner's rejections and the amended claims may be helpful to expedite prosecution.

Independent claim 19 relates to a method of generating a measured amount of a liquid chemical in a single semiconductor wafer etching or cleaning process comprising: flowing a liquid chemical into a valve system having a tube of a known volume; filling said tube to generate a measured amount of liquid chemical approximately equal to the known volume of the tube; wherein the measured amount of liquid chemical is pushed out of the tube with a flushing fluid, comprising a precisely measured amount of DI water; mixing precisely the measured amount of the liquid chemical with the precisely measured DI water in a **pressurized chamber**;

wherein the pressurized chamber has an internal pressure throughout the chamber which is substantially **greater than one atmosphere**; and applying approximately the **entire** chemical mixture within the pressurized chamber to a single wafer in a single wafer process, wherein an **inert gas pushes** the chemical mixture through a **dispenser or spray nozzle** onto the wafer; wherein the applied chemical mixture is of a known measured concentration.

Applicants have recognized the advantage of mixing a batch of chemicals sufficient for only one wafer in a single wafer process, instead of a large batch of chemicals for a number of wafers, so as to apply a consistently fresh batch of chemicals to every wafer. Therefore, applying the **entire mixture** onto the wafer provides a consistent and freshly mixed batch of chemicals for every wafer, even if there are irregular delays between wafers being processed. Further, a **pressurized chamber**, having a pressure **greater than one atmosphere**, provides the **inert gas** with enough pressure to push the mixture out of the chamber more quickly and thus improving wafer throughput, particularly when the mixture passes through a **dispenser or spray nozzle** having a high fluid flow resistance.

In contrast, McConnell fails to disclose or suggest applying the **entire** mixture from the chamber and actually teaches away from the invention. McConnell discloses applying only a portion of the mixture in the tank. Further, McConnell also fails to disclose or suggest having the tank **pressurized substantially above one atmosphere**, nor the use of an **inert gas to push** the mixture through a **dispenser or spray nozzle**. Similarly, Nakata also fails to disclose or suggest any of these elements, and thus fails to remedy the deficiencies of McConnell.

Applicant asserts that a pressurized chamber is commonly understood in the art to mean a chamber having an absolute pressure substantially greater than one atmosphere. However, in order to expedite prosecution of the invention, Applicant has amended the claims to reflect the commonly understood meaning of a pressurized chamber.

In addition, Examiner's rejection, which modifies Nakata in light of McConnell, appears to be inconsistent with Examiner's arguments, which appear to suggest modifying McConnell in light of Nakata. Nakata discloses a precise means of supplying a fluid into a gas chromatographer, thus modifying Nakata would appear to require the introduction of many elements including a chamber and a means of dispensing the fluid onto a wafer for a semiconductor cleaning process. However, the Examiner argues that it would have been obvious to "modify Nakata to accurately measure a precise amount of HF in a controlled volume of water during ... as suggested by McConnell to provide a desirable precise volume of fluid into another fluid ... because Nakata discloses accurately delivering a known volume of one fluid into another ... to successfully provide accurate concentrations during a semiconductor cleaning process." If the Examiner is modifying Nakata, then the motivational statement is unclear because the motivation relies on providing an accurate volume of fluid, which Nakata allegedly already discloses. The motivational statement is required to reflect the elements disclosed in McConnell, which are being used to modify Nakata. The Examiner's motivation seems to reflect the component of Nakata, which is **not** being modified, in order to modify McConnell

Examiner is actually modifying McConnell with the fluid measuring method disclosed in Nakata. Examiner's combination appears to be improper and lacks clarity.

Applicant requests clarification.

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Applicant, accordingly, respectfully requests withdrawal of the rejection of claims 19-21, 26-27, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable Nakata in view of McConnell.

The Examiner has rejected claims 22 and 28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. 3,045,702 by Nakata (hereinafter "Nakata") in view of McConnell as applied to claims 19, 23, and 26 above, and further in view of U.S. Pat. 4,243,071 by Shackelford (hereinafter "Shackelford"). In light of the amendment, the Examiner's rejections have become moot. Further, in view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim. Nonetheless, the following remarks regarding the Examiner's rejections and the amended claims may be

helpful to expedite prosecution.

Inventor(s): Steven Verhaverbeke, et al.  
Application No.: 09/891,833  
AMAT Ref No. 004730USA  
BSTZ Ref No. 4887.P451

- 14/19-

Examiner: Turocy, David P.  
Art Unit: 1762

Shackelford is introduced to allegedly disclose the element of interchanging the tube in order to change the volume of the chemicals being measured. However, Shackelford fails to remedy the deficiencies of Nakata and McConnell. Shackelford fails to disclose or suggest a chamber **pressurized substantially above one atmosphere**, nor the use of an **inert gas to push the entire** mixture through a **dispenser or spray nozzle**.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 22 and 28 under 35 U.S.C. § 103(a) as being unpatentable Nakata in view of McConnell as applied to claims 19, 23, and 26 above, and further in view of Shackelford.

The Examiner has rejected claims 32-38 under 35 U.S.C. § 103(a) as being unpatentable by U.S. Pat. 3,291,347 by Blades (hereinafter "Blades") in view of Shackelford. In light of the amendment, the Examiner's rejections have become moot. Nonetheless, the following remarks regarding the Examiner's rejections and the amended claims may be helpful to expedite prosecution.

Independent claim 32 relates to a method of mixing chemicals comprising: flowing a first liquid chemical into a first valve system having a first tube of a known volume and completely filling said first tube with said first liquid chemical to generate a measured amount of said first liquid chemical; flowing a second liquid chemical into a second valve system having a second tube of a known volume and

completely filling said second tube with said second liquid chemical to generate a

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measured amount of said second liquid chemical; wherein, the first and second **tubes** are **external to the valves** in the first and second valve systems; flowing a first and second flushing fluid into said first and second valve systems, respectively, to discharge only said measured amount of said first liquid chemical into a first exhaust unit and only said measured amount of said second liquid chemical into a second exhaust unit, wherein precisely said measured amount of first liquid chemical and precisely said measured amount of second liquid chemical are mixed together, forming a chemical mixture; wherein, at least one of said first and second flushing fluids have an approximately know volume; and **dispensing the chemical mixture onto a wafer**, wherein an **inert gas pushes** the chemical mixture out onto the wafer with an absolute **pressure substantially greater than one atmosphere**.

Applicant has recognized the advantages of **dispensing the entire chemical mixture onto a wafer**, wherein an **inert gas pushes** the chemical mixture out onto the wafer with an absolute **pressure substantially greater than one atmosphere**. Further, Applicant has recognized the advantages of providing measuring tubes **external** to the valve structures. Applying the **entire mixture** onto the wafer provides a **consistent** and **freshly mixed batch** of chemicals for **every wafer**, even if there are irregular delays between the wafers being processed. Further, a **pressurized chamber**, having a pressure **greater than one atmosphere**, provides the **inert gas** with enough pressure to push the mixture out of the chamber more quickly and thus improving wafer throughput. Further, the ability to change the measuring tubes external to the valves has the advantage of greater process flexibility, reduced costs, and less down time during servicing.

In contrast, Blades fails to disclose or suggest **dispensing the entire chemical mixture onto a wafer**, wherein an **inert gas pushes** the chemical mixture out onto the wafer with an absolute **pressure substantially greater than one atmosphere**, nor providing measuring tubes **external** to the valve structures. Similarly, Shackelford also fails to disclose or suggest **dispensing the entire chemical mixture onto a wafer**, wherein an **inert gas pushes** the chemical mixture out onto the wafer with an absolute **pressure substantially greater than one atmosphere**. Shackelford appears to disclose providing measuring tubes **external** to the valve structure. However, Applicant asserts that Blades and Shackelford teach away from each other and fail to produce a functional structure, and thus are not combinable.

Examiner's rejection modifies Blades by introducing external measuring tubes to the structure in Blades, but it is unclear how specifically one is to modify Blades, so as to change the volume of the measured chemical. Since the measuring tubes in Blades are internal to the valve structure, merely adding or changing tubes external to the valve, as indicated by Shackelford and the Examiner's rejection, would appear to have **no effect on the volume of the internal measuring tubes** inside of the valve and hence would have **no effect on the amount of chemicals being measured**. Therefore, the combination of Blades and Shackelford results in an **ineffective** device, making the combination improper. Further, since Blades discloses **measuring tubes internal** to the valve and Shackelford discloses measuring tubes **external to the valve**, it appears that one would have to contravene the teachings of Blades to remove the internal measuring tubes to have

any prospect of reconstructing the claimed invention. Thus, Blades teaching away from both Shackelford and the claimed invention.

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 32-38 under 35 U.S.C. § 103(a) as being unpatentable over Blades in view of Shackelford.



**Allowable Subject Matter**

Applicant has noted, with appreciation, that the Examiner has allowed claims 8-13, 18, 23-25 and 39-42.

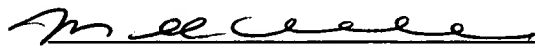
Applicant respectfully submits that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call Michael A. Bernadicou at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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